

WILDLIFE MANAGEMENT INDICATOR HABITAT-AQUATIC

Monitoring Conducted

Dark River Monitoring

The Superior National Forest (SNF) cooperated with the Minnesota Department of Natural Resources, Fond du Lac Band of Lake Superior Chippewa, 1854 Treaty Authority, Minnesota Conservation Corps, Trout Unlimited, and the Laurentian Environmental Center to continue monitoring fish populations in the Dark River prior to initiating and completing a large stream channel habitat improvement project in 2009-2010 (Photo 1). Specific fish population and stream habitat monitoring objectives include evaluating short-term (4 years) changes in channel stability, water temperature, trout abundance, morphological trout habitat variables, and fish and invertebrate community indices, before and after the stream channel work is completed (Dustin 2008). Six stream reaches were successfully sampled in the Dark River in 2007 including Leander (downstream end of proposed work area), Potlatch-1 (upstream end of the proposed work area), Potlatch-2 (control reach – upstream from Potlatch work area), Highway 65 (proposed work area), Highway 65-upstream (control reach upstream from work area) and a project reference reach near the gauging station.



Photo 1. Stream electrofishing in the Dark River.

Stream channel conditions, large woody debris structures, and fish populations were also monitored within the 2005 Dark River Habitat Improvement Project Area in 2007. In 2005 and 2006, sampling occurred in July whereas in 2007, sampling occurred in August.

Aquatic MIH Summary Points

- ✱ Fish population surveys in the Dark River indicated that brook trout populations have remained relatively stable or have increased.
- ✱ Brook trout abundance within the Dark River Large Woody Debris Project Area has increased from that observed in 2005.
- ✱ Walleye populations in both Cascade and White Pine Lakes appear to be relatively stable. It is likely that the 2003 year class (age-4 fish) and 2001 year class (age-6 fish) will continue to support the Cascade Lake fishery for several years. Relatively strong 2006 (age-1) and 2007 (age-0) year classes were documented in several lakes on the Forest.
- ✱ The SNF has increased its ability to monitor aquatic Management Indicator Habitat and important lake and stream fish populations across the Forest by working with several partners, including the Minnesota Department of Natural Resources, Fond Du Lac Band of Lake Superior Chippewa, 1854 Authority, Trout Unlimited, and the Laurentian Environmental Center.
- ✱ Protocols developed to monitor long-term trends in stream habitat, fish populations, and water quality have been very successful. It will be important for the SNF to continue improving existing protocols and to collaborate with external partners to identify priority monitoring sites.



Photo 2. Logs placed in the Dark River to improve fish habitat. (Photo Courtesy Andv Edwards & Brian Borkholder)

Forest-wide Fish Population Monitoring at Established Stream Monitoring Reaches

Stream monitoring reach surveys occurred at 7 established monitoring sites within the Virginia and Devil Trout Project Areas and at 1 new site within the Mid-Temperance Project Area. Stream monitoring reach information collected during these surveys included stream channel cross sections, longitudinal profiles, pebble (substrate) counts, and fish population data. Fish population monitoring data is summarized in this Chapter. Please see the Watershed, Riparian, and Aquatics Chapter for additional stream monitoring reach information and results.



Photo 3. Measuring captured fish within an established stream monitoring reach.



Photo 4. Nighttime electrofishing surveys
(Photo Courtesy Andy Edwards & Brian Borkholder)

Spring and Fall Walleye Assessments

The Superior National Forest cooperated with the Fond Du Lac Band of Lake Superior Chippewa and the 1854 Treaty Authority to conduct spring and fall walleye assessments in 2007. The objective of the spring assessment is to obtain adult walleye population estimates from mark and recapture studies utilizing electrofishing and gill net gear (Borkholder and Edwards 2008). The objective of the fall assessments is to evaluate recruitment and year class strength of age-0 and age-1 walleye as well as to continue collecting long-term population trend data (Borkholder and Edwards 2008). In 2007, spring assessments occurred in two lakes including Cascade and White Pine. Fall assessments occurred in 23 lakes across the Forest.

Evaluation and Conclusions

Dark River Monitoring

As in previous years, the majority of adult and young-of-the-year (YOY) brook trout were captured in the reference reach near the gauging station (Dustin 2008; Photo 5). Young-of-the-year brook trout were captured for the first time in the Potlatch-1 station in 2007 (Dustin 2008). Very few brook trout were captured in the Leander and the Potlatch-2 stations and no brook trout were captured at the Highway 65 stations (Dustin 2008). Although adult brook trout have been captured at all work and reference reach sites, except the proposed work area near Highway 65, overall abundance is still very low at these sites compared to the reference reach near the Dark River gauging station.



Photo 5. Juvenile brook trout (Photo – Dan Kenney)

It is very likely that abundance of brook trout within the Leander, Potlatch, and Highway 65 sites is directly related to the quality of stream habitat available. In reviewing the 2004 fish habitat survey, Dustin (2008) suggested that the lack of large woody debris and overhead cover was likely the primary factor limiting trout abundance in the Potlatch Area.

Dark River Large Woody Debris Project Monitoring

Monitoring results indicated that there was little change in the large woody debris structures that were placed in the stream channel to improve habitat in 2005. There was also little change in stream channel and substrate conditions at established stream cross sections with the exception of some anticipated scouring behind logs and sorting of gravels. Relative abundance of brook trout, as measured by catch per unit effort (CPUE) (number of fish per caught per electrofishing minute) was higher in 2006 and 2007 than in 2005 (Figure 1).

Relative abundance of brook trout captured within the reference reach near the gauging station was also higher in 2006 and 2007 than in 2005 (Figure 1). Overall, based upon brook trout catches in both the project area and reference reaches, it is possible that brook trout abundance within the large woody debris project area has increased due to both instream habitat improvements and increasing brook trout populations in the Dark River.

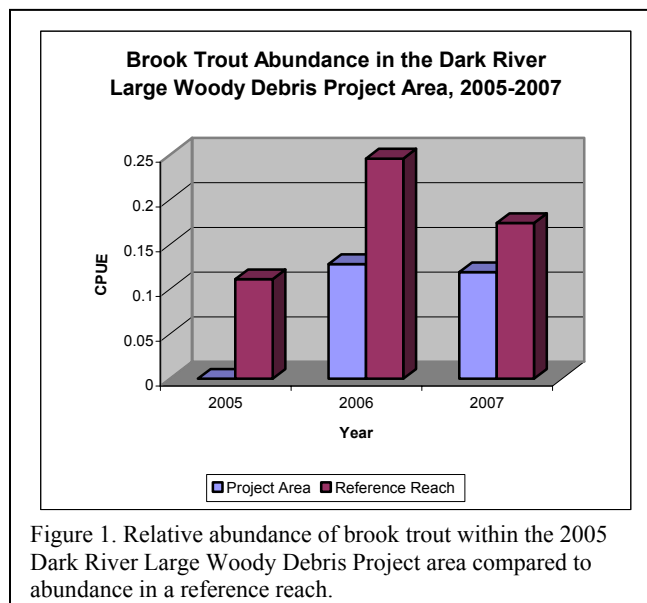


Figure 1. Relative abundance of brook trout within the 2005 Dark River Large Woody Debris Project area compared to abundance in a reference reach.

Forest-wide Fish Population Monitoring at Established Stream Monitoring Reaches

Catch per unit effort (CPUE) within the 7 established stream reaches differed between survey years (2005 vs. 2007) for many fish species at individual stream survey sites. However, it is too early to detect trends in fish population abundance based on only two years of survey data (Table 1). Interestingly, CPUE for most fish species in Leander and Elbow Creeks, two coldwater trout streams, increased between 2005 and 2007, indicating that these streams and their habitats have continued to provide good quality habitat for cold/cool water fish communities. Catch per unit effort for several fish species also increased in McNiven and West Knuckey Creeks between 2005 and 2007 (Table 1). Catch per unit effort decreased for several fish species at the Slow Creek 532 site (Table 1). It is anticipated that this monitoring information will be useful for detecting long term trends of fish communities as well as stream habitat quality.

Although fish population surveys have been very useful for identifying and understanding existing populations, it is currently difficult to detect trends in fish species abundance and diversity or changes in stream habitat and water quality with only two years of monitoring information. It is anticipated that future monitoring surveys will be useful for evaluating long-term trends and the effectiveness of best management practices for protecting stream water quality and aquatic habitat.

Table 1. Catch per unit effort (CPUE) (Number of fish captured per electrofishing minute) for selected fish species during surveys at stream monitoring sites on the Superior National Forest in 2005 and 2007.

Species	CPUE By Stream and Year of Monitoring							
	Leander	Leander	Murray	Murray	McNiven	McNiven	Slow 688	Slow 688
	<u>2005</u>	<u>2007</u>	<u>2005</u>	<u>2007</u>	<u>2005</u>	<u>2007</u>	<u>2005</u>	<u>2007</u>
Brook Trout	1.475	3.797	0.000	0.000	0.000	0.000	0.000	0.000
Black Nose Dace	0.476	0.709	0.000	0.000	1.171	2.141	0.000	0.000
Creek Chub	2.379	3.038	1.146	1.823	2.927	7.654	1.181	1.084
Finescale Dace	0.000	0.051	2.292	0.182	0.220	0.482	1.918	1.238
Common Shiner	0.000	0.000	0.409	0.000	0.732	3.158	0.000	0.000
White Sucker	0.095	0.000	0.409	0.000	0.037	1.178	0.000	0.000
Brook Stickleback	0.000	0.000	0.819	0.911	0.183	0.054	0.561	0.619
Johnny Darter	0.000	0.000	0.327	0.000	0.000	0.482	0.000	0.000
Mottled Sculpin	0.333	0.405	0.000	0.000	0.000	0.000	0.000	0.000
Central Mudmimmow	0.048	0.051	2.783	1.033	0.476	0.375	0.413	2.322
Black Bullhead	0.000	0.000	0.000	0.000	0.000	0.054	0.000	0.000
		Slow 532	Slow 532	W. Knucky	W. Knucky	Elbow	Elbow	
		<u>2005</u>	<u>2007</u>	<u>2005</u>	<u>2007</u>	<u>2005</u>	<u>2007</u>	
Brook Trout		0.000	0.000	0.772	0.442	1.316	1.897	
Black Nose Dace		1.657	0.334	0.237	0.353	0.318	1.463	
Creek Chub		1.548	0.297	0.772	2.342	0.136	0.542	
Finescale Dace		0.679	0.297	0.000	0.044	0.000	0.000	
Common Shiner		0.869	0.297	0.000	0.044	0.000	0.217	
White Sucker		0.869	1.114	0.000	0.309	0.000	0.000	
Brook Stickleback		0.054	0.186	0.000	0.044	0.000	0.000	
Johnny Darter		0.136	0.074	0.000	0.000	0.000	0.000	
Mottled Sculpin		0.000	0.000	0.119	0.265	0.136	0.325	
Central Mudmimmow		1.358	0.186	0.297	2.563	0.000	0.000	
Black Bullhead		0.000	0.111	0.000	0.000	0.000	0.000	